

Fuel Cell Recuperator

A major developer of fuel cell technology required a custom heat exchanger capable of cooling a hot gas mixture at **1200°F** and water at **0.108 psi** — functioning as a regenerative heat exchanger to recover heat from the outgoing stream and preheat the incoming gas supply to the fuel cell.

The Challenge

- Extreme operating temperatures up to 1200°F
- High thermal stress in a demanding environment
- Small geometry to fit within a tight spatial envelope
- Durability and zero maintenance requirements

The Solution

- Custom tube-in-tube heat exchanger by Exergy
- Inner tube: **Inconel 600** for high-temp & thermal stress resistance
- Outer tube: **316L stainless steel** for corrosion resistance
- Custom fittings welded to tube ends for seamless integration

The Results

- Effective heat recovery from the hot gas stream
- Successful preheating of incoming fuel cell gas
- Improved overall system efficiency
- Reliable operation with no maintenance requirements

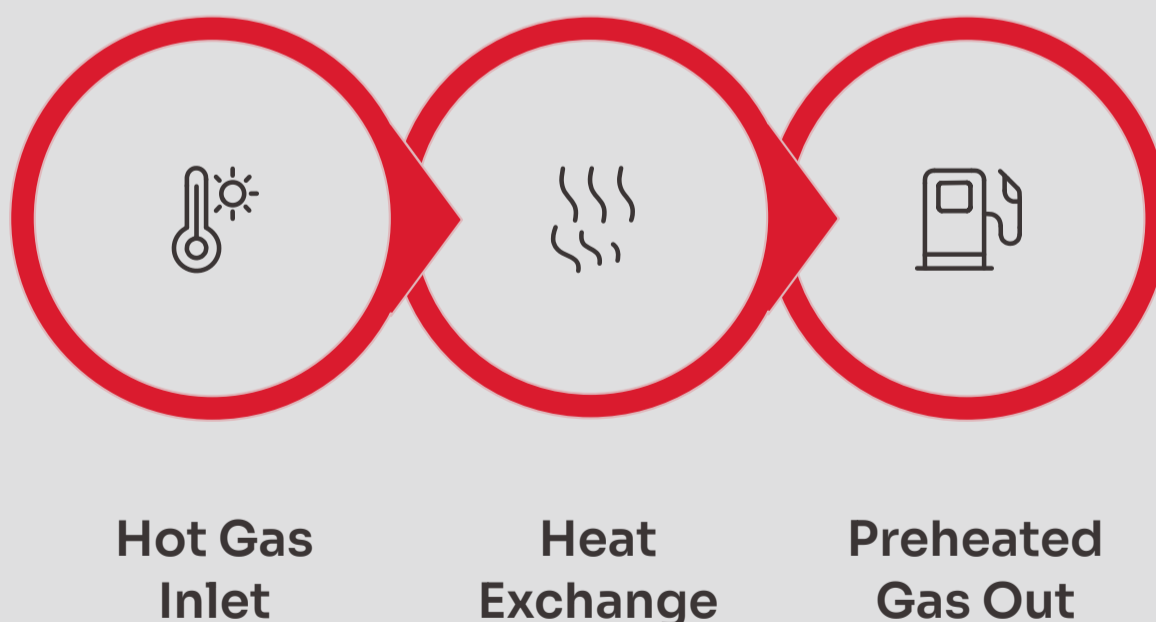
Engineering Excellence

This case highlights Exergy's ability to deliver **customized, high-performance heat exchangers** for advanced energy applications. By leveraging deep expertise in material selection and precision engineering, Exergy created a solution that met stringent thermal, spatial, and operational demands enabling greater efficiency in fuel cell technology.

The compact and rugged design provided reliable operation under extreme conditions, demonstrating that even the most demanding environments can be addressed through thoughtful engineering and material science.

Key Specifications

- Gas inlet temperature: **1200°F**
- Water pressure: **0.108 psi**
- Inner tube: **Inconel 600**
- Outer tube: **316L Stainless Steel**
- Configuration: **Tube-in-Tube**
- Custom welded fittings
- Zero maintenance design



The regenerative heat exchange cycle recovers thermal energy from the outgoing stream, redirecting it to preheat the incoming fuel cell gas supply — maximizing system efficiency and minimizing energy waste.

- ✔ Exergy's custom recuperator solution demonstrates world-class precision engineering: matching extreme thermal demands with the right materials, compact form factor, and zero-maintenance reliability for next-generation fuel cell technology.